Keeping Hazards From Becoming Disasters

A Mitigation Workbook for Local Governments

Washington State Emergency Management Division
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Washington State Military Department
Emergency Management Division
Camp Murray, WA 98430-5122

In grateful appreciation to North Carolina Division of Emergency Management for allowing us to replicate and modify *Keeping Natural Hazards from Becoming Natural Disasters: A Workbook for Local Governments* for use in Washington State.

INTRODUCTION

Floods, wind storms, winter storms, volcanic eruptions, earthquakes and wildfires: natural hazards are part of the world around us. Their occurrence is inevitable. These events can wreak havoc on the natural environment – uprooting trees, eroding riverbanks and shorelines, carving new inlets, blackening forests. Yet, the natural environment is amazingly resilient, often recuperating in a matter of days or weeks.

Disasters occur when a hazard crosses paths with the human-made environment, such as buildings, roads, pipelines, and crops. When wind storms tear roofs off houses, it is a disaster. When earthquakes ravage a town, it is a disaster, and when floods invade low-lying homes, it is a disaster. If only wetlands and floodplains that are not developed were flooded, rather than homes and businesses, we would hardly take notice. The natural environment takes care of itself. The human-made environment, in contrast, often needs assistance.

What is Hazard Mitigation?

Hazard mitigation is the practice of reducing risks to people and property from natural hazards. It includes both structural interventions, such as flood control levees, and nonstructural measures, such as avoiding construction in the most flood-prone areas. Mitigation includes not only avoiding the development of vulnerable sections of the community, but also making existing development in hazard-prone areas safer. For example, a community could identify areas in the community that are susceptible to damage from natural hazards and take steps to make these areas less vulnerable. It could also steer growth to less risky areas. Keeping buildings and people out of harm's way is the essence of hazard mitigation.

Mitigation should not be seen as an impediment to the growth and development of a community. On the contrary, incorporating mitigation into decisions related to your community's growth can result in a safer, more resilient community, and one that is more attractive to new families and business.

Why Develop a Hazard Mitigation Strategy?

Developing a mitigation strategy completes the process of planning that began with the state Comprehensive Emergency Management Plan (CEMP). The CEMP requires the development of a comprehensive identification and analysis of the state's hazards, which can be found in the *Washington State Hazard Identification Vulnerability Analysis.* However, hazard identification and analysis are incomplete processes without developing a plan to mitigate those hazards. Our state is subject to many types of natural hazards: landslides, hurricanes, earthquakes, winter storms, floods, tornadoes, wind storms, and wildfires, all of which can have significant economic and social impact. Some, such as wildfires, are seasonal and strike in predictable locations. Others, such as earthquakes, can occur anytime of the year and almost anywhere in the state. The *Washington State Hazard Identification Vulnerability Analysis* will help you determine historically the most likely and most damaging hazards in your area.

What Are the Benefits of Hazard Mitigation?

Hazard mitigation offers many benefits for your community:

- Saves lives and property – Your community can save lives and reduce property damage from all hazards through mitigation actions,

such as moving families and their homes out of harm's way.

- Reduces vulnerability to future hazards – By having a mitigation strategy in place, your community is prepared to take steps that will permanently reduce the risk of future losses. This opportunity is often lost when we build our communities without regard to hazards or when we rebuild them after a disaster "just as they were before." While it is natural to want to return things to the way they were, it is important to remember that, in many cases, the disaster would not have been as severe if a mitigation plan had been implemented.

- Facilitates post-disaster funding – By identifying and ranking projects before the next disaster, your community will be in a better position to obtain post-disaster funding because much of the background work necessary for applying for funding assistance will already be done.

- Speeds recovery – By developing a mitigation strategy, your community can identify post-disaster mitigation opportunities in advance of a disaster. By having this strategy thought-out in advance, your community will be ready to respond quickly after a disaster.

- Demonstrates commitment to improving community health and safety – A mitigation strategy demonstrates a community's commitment to safeguarding its citizens and protecting its economic and environmental well being.

Purpose of the Workbook

This workbook was prepared to help you develop and implement a successful strategy to reduce your community's vulnerability to hazards. When you finish the workbook, you will have an outline for reducing your community's vulnerability to all hazards. This workbook will help you explore the current state of your community, including identifying hazard areas and existing policies that affect those areas. The workbook will help you define goals for increasing your community's hazard resilience, identify mitigation strategies, and assign responsibility for action.

How to Use This Workbook

To get the most out of this workbook, you should read each section before you fill out the worksheets. Refer to the glossary if there are any unfamiliar terms. You can find help or places to look for help in "Appendix A: Where to Get Help" on page 22.

"My heart's been warmed by watching the best in people come out when disaster strikes. But my heart's been broken by seeing pain I knew could have been prevented."

--James Lee Witt

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GETTING STARTED

Before you begin, your community must decide who will be responsible for developing the mitigation strategy. Where time and resources are short, some communities may decide to assign the responsibility to a manager or clerk. Others may choose to establish a working group comprised of officials from various departments, such as planning, building, community development, transportation, public works, and emergency management. Larger communities may seek involvement from the business sector, community groups, and the public. Create your list of participants and keep a copy with this book.

This workbook will take you through five steps to establish a mitigation strategy. These steps are designed to be followed sequentially. You do not need to do them in one session, but you should keep to the prescribed order because each step builds on work you did before. You may wish to look over the brief summary of steps 1-5 below so that you know what information you will need before you begin.

Step 1: Hazard Identification and Analysis. This step asks you to broadly identify the hazards that affect your community and to analyze them in terms of frequency, strength, and likely location of occurrence. You will want to have a map of your community, county, and local road maps, a map showing local topography and flood-prone areas (such as a flood insurance rate map [FIRM]), and any available sources of data regarding where and when hazards have hit your community.

Step 2: Vulnerability Assessment. In this step, you will determine the potential for damage in each hazard-prone area of your community. This step will help you determine which areas would be most affected by a hazard event. You will want to have the tools to establish an inventory of each area, such as a population count or home and business assessed values. This can be done in different ways. For example, your community might choose to do a qualitative assessment using approximate values or more detailed inventory with actual values from a tax assessment map.

When you finish steps 1 and 2, you will have a list of problems that need to be addressed. In step 3, you will examine what your community is already doing to address those problems.

Step 3: Community Capacity. This step asks you to assess your community's current mitigation activities. While few communities in Washington have a dedicated mitigation strategy, most have policies that affect construction in hazard-prone areas. The workbook will suggest policies and categories of policies to look for. You may also need to identify common regulations, such as zoning, which may unintentionally counter your mitigation efforts. You will need to have the applicable policy documents at hand, including your community's comprehensive plan or other applicable documents.

By the end of step 3, you will have a sense of the existing conditions in your community: where the potential problems are, and what is already in place to provide solutions. In the next two steps, you will create solutions to address the remaining problems and plan for action.

Step 4: Community Goals. In this step, you will determine how mitigation fits into your community's vision of its future. Mitigation may not be explicitly mentioned in your vision statement, goals, and objectives, but you should identify where it could overlap with other community goals. You will need a copy of your community's vision statement or general plan. If your community does not have these documents,

you should use your best judgement or survey community leaders to discern what the community's goals are.

Step 5: Mitigation Strategy. Now that you have a list of issues to address, you can establish a plan to address them. Some issues may be addressed effectively by implementing existing policies or making modifications to those policies. Others will require new initiatives. You may choose to rank the policies in a way that helps you plan your implementation. You will also need to assign responsibility for each initiative. You may wish to set an implementation schedule after consulting with the responsible department or officer.

"THE TIME HAS COME TO FACE THE FACT THAT THIS NATION CAN NO LONGER AFFORD THE HIGH COSTS OF NATURAL DISASTERS. WE CAN NO LONGER AFFORD THE ECONOMIC COSTS TO THE AMERICAN TAXPAYER, NOR CAN WE AFFORD THE SOCIAL COSTS TO OUR COMMUNITIES AND INDIVIDUALS."

James Lee Witt, Director, FEMA
Testimony Before U.S. Congress
October 27, 1993

STEP 1: HAZARD IDENTIFICATION AND ANALYSIS

The first step is to decide on which hazards to focus your attention and resources. To plan for hazards and reduce losses, a local government needs to know the:

1. **type** of hazards that threaten the community,
2. **likelihood of occurrence** of the hazards,
3. **location** of the community that is most vulnerable,
4. **impact** of the hazard, and
5. **strength** of the hazard.

Worksheet 1 will help you organize the information needed for items 1-5. In completing the worksheet, you can use either a qualitative scale (such as low – medium – high, or mild – moderate – severe), or a numeric scale (such as 1-5). For example, a landslide or earthquake that destroys numerous homes could be severe, while flooding that temporarily makes a road impassible could be moderate or mild.

- **Type** – Washington State experiences many different types of hazards. Some are more likely than others to occur in your community. Different hazards call for different mitigation measures. The preferred approach is to consider all the hazards that threaten your community and focus on those that pose the greatest risk. Cross out any hazard that does not apply. Add hazards not listed.

- **Likelihood of Occurrence** – You should estimate the likelihood of each type of hazard occurring in your area. Base this estimate on local historical evidence and by reference to the *Washington State Hazard Identification Vulnerability Analysis*.

- **Location** – Certain areas, such as liquefaction zones, floodplains, and steep slopes, are more prone to hazards than others. Many of these areas are readily identifiable on maps. Identify the areas that are most vulnerable to each hazard and mark whether they cover a small, medium, or large proportion of you community.

- **Impact** – Each community should determine the likely impact of each hazard. This is a combination of the likely strength of the event, the size of the area(s) affected, and the density of the human activity in that area. For the moment, these impacts should be evaluated only in terms of strength and size of area, and should be ranked high, medium, or low. You will evaluate the potential impact of hazards on human activity in your community on the next worksheet. The strength of hazards varies across the state.

- **Hazard Index** – Some hazards have extraordinary impacts, but occur infrequently (for example, severe earthquakes). Other hazards occur annually or several times a decade, but cause less damage (for example wind storms and floods). You may use this last column to identify which type of risk each hazard poses for your community. For example, you should rank high likelihood, high impact hazards as your primary objective.

WORKSHEET #1: HAZARD IDENTIFICATION AND ANALYSIS

(See *Washington State Hazard Identification Vulnerability Analysis*)				
Hazard	**Likelihood of Occurrence**	**Location** (i.e., small, medium, large)	**Impacts** (i.e., low, medium, high)	**Hazard Index** (i.e., rank by combining how much impact & how frequently this hazard affects your community)
Earthquake				
Landslide				
Flooding				
Wildfire				
Hazardous Materials				
Tornado				
Winter Storms				
Wind Storms				

STEP 2: VULNERABILITY ASSESSMENT

In developing a strategy to reduce the impact of hazards, your community will need to determine its present and future vulnerability to such hazards. You can calculate vulnerability by combining the probability of various hazards in each area (as determined from Worksheet #1), with the amount and value of development in that area (to be determined in this step). A community should inventory and estimate the cost of damage to critical facilities (e.g., a hospital or waste treatment facility) and highly vulnerable residential, commercial, industrial and public facilities. You can use Worksheet #2 to help assess your community's present and future vulnerability. Worksheet 2a could be copied to come up with a synthesized vulnerability summary for your community.

Preparing an inventory of people and property at risk is an essential part of assessing your vulnerability to hazards. In addition, the "Community Rating System" gives points for an assessment of the impact of flooding on a community if it includes an inventory of the number and types of buildings subject to the hazards identified in the hazard assessment. Therefore, preparing this inventory can also help your community get subsidized flood insurance and other assistance in the future.

Assessing your community's vulnerability involves:

1. Identifying (by name or neighborhood) areas of greatest risk,
2. conducting an inventory of those areas, and
3. putting these areas on a map.

- **Identifying areas of greatest risk.**

  Refer to Worksheet #1 to identify those areas in the community that are subject to the greatest risk of damage from a hazard. Copy and fill out a Worksheet #2 for each hazard-prone area in your community.

- **Conduct an inventory of the "current" population in vulnerable areas.**

  The first three columns of Worksheet #2 ask you to estimate the current number of people and buildings, and the value of those buildings, located in the hazard-prone area.

  - Estimate your current population using either current local figures or the current version of *Population Trends* produced by the Washington State Office of Financial Management.

  - Establish building count and approximate values in one of two ways. Choose between doing an assessment using approximate values or a more detailed inventory with actual numbers and values from a tax assessment map.

- **Conduct an inventory of "projected population" in vulnerable areas.**

  The next three columns of Worksheet #2 ask you to estimate the projected population and number of buildings, and the value of those buildings, located in each hazard-prone area.

  - Estimate how many people will be in the vulnerable areas in the future if current land use policies remain unchanged. Note that for these estimates you should use the maximum number of people who may be affected. For example, if your community has seasonal influxes of people, you should use population estimates that reflect the largest number of people in your community. This will ensure that your community is adequately protected year-round.

  - Method for estimating population: If your community has not developed a method of projecting growth, one way is to rely on past growth trends. Table 1: County Population

Estimates, on page 30, provides these trends for you. These growth rates were calculated using the growth observed between the 1980 U.S. Census and the 1998 Office of Financial Management Growth Estimates.

- **Conduct an inventory of "projected" number of buildings in vulnerable area.**

  - To project a future number of buildings, simply calculate a ratio of people to buildings. To do this, divide the current population estimate from column 1 by the current number of buildings from column 2. You should repeat this method to figure out the future demand for commercial and industrial buildings, public buildings, and critical facilities. Use the residential population figures for each of these steps. This will give you a way to estimate the number of new buildings you will need based on population. For example, if your ratio results in 100 people per commercial building, you can estimate that 1,000 new residents would require the development of 10 new commercial buildings in the future.

  - To complete the approximate value column you can multiply the estimated future number of buildings times the average present value for that type of building. Note: this will be an underestimate of future value because it doesn't account for appreciation and inflation, but it will give you a rough estimate.

  - In addition, your local comprehensive plan should be a good source of information on future trends and conditions, such as whether future growth is likely to occur in areas highly vulnerable to hazards given existing policies.

  NOTE: These estimates are designed to give you ballpark figures to help you consider development in your community for the purpose of this exercise **ONLY**. They are extremely rough estimates that should **NOT** be used for any other purpose.

- **Prepare a map showing the areas identified above.**

  Prepare a map that shows the areas of highest risk and that marks the critical facilities, major employers, repetitively damaged structures, and infrastructure in those areas. Areas prone to flooding that are not included on the Flood Insurance Rate Maps should be marked on the map. You should also identify areas subject to hazards other than floods, such as steeply sloped areas and liquefaction zones.

- **Summarize your findings on Worksheet 2a: Total Vulnerability Summary.**

  Total your copies of Worksheet 2 on Worksheet 2a: Total Vulnerability Summary. This will help you assess the vulnerability of your entire community at the present and for the future.

WORKSHEET #2: AREA VULNERABILITY ASSESSMENT

Hazard Area Location _____

(Copy this form and complete for each hazard in your community)

	Developed Land			Undeveloped Land		
	Number of People (table 1, col. 2)	**Number of Buildings** (from tax records)	**Approximate Value** (from tax records)	**Number of People** (Table 1, column 5 if developed under existing policies)	**Number of Buildings** (if developed under existing conditions)	**Approximate Value** (average current value times the number of buildings from the previous column)
Residential (use max. figures)						
Commercial						
Industrial						
Public Buildings and Critical Facilities						
Sewage Treatment Plant						
Water Treatment Plant						
Hospitals						
Schools						
Roads						
Police						
Fire						
Hazardous Facilities						
Total						

WORKSHEET #2a: TOTAL VULNERABILITY SUMMARY

Developed Land					Undeveloped Land		
Hazard Area Location	**Total People**	**Total Buildings** (by type - example residential = commercial = industrial =)	**Approximate Value** (in dollars)	**Number of Critical Facilities** (example - water treatement plant)	**Projected Number of People**	**Projected Number of Buildings**	**Projected Value**
Total							

STEP 3: COMMUNITY CAPABILITY ASSESSMENT

The capability assessment will help you analyze your community's current capacity to address the threats posed by hazards. It identifies and evaluates existing policies and programs that either increase or decrease your jurisdiction's vulnerability to natural hazards. The capability assessment is more than a mere inventory of existing mitigation measures and organizations with hazard mitigation responsibility. It should also help you understand why certain policies may or may not be effective at mitigating hazards.

- **Analyze policies, programs, and ordinances that may affect vulnerability.**

  Prepare a list of the community's existing and proposed mitigation initiatives and the policies, ordinances and regulations that guide these efforts.

- **Record on Worksheet 3 existing policies and programs that may increase or decrease your community's vulnerability to hazards. List a document page reference for each, if applicable.**

  You should identify current policies that weaken hazard mitigation efforts and those that enhance them. For example, by extending public facilities into hazard-prone areas, a community may unintentionally aid development in these areas. Such policies weaken mitigation efforts. You should also identify areas where no policy exists and therefore new policies are needed to reduce current and future risks of hazards.

The following are some examples of policies you should look for:

✓ Policies that restrict or encourage development in hazard-prone areas.

✓ Policies that allow improvements or activities in hazard-prone areas.

✓ Economic incentives (such as tax relief) that encourage or discourage development in high hazard areas.

✓ Policies that encourage the removal or relocation of buildings in the floodplain.

✓ Polices that protect critical facilities, such as police stations and emergency shelters (e.g., elevate them or prohibit their construction in hazard-prone areas).

✓ Policies that encourage the acquisition of properties, especially those in hazard-prone areas.

✓ Policies or projects that earn community credit through the Community Rating System.

✓ Policies that limit development in environmentally sensitive areas such as steep slopes.

✓ Policies that protect mitigating features of the environment, such as wetlands or dunes.

- **Evaluate the effectiveness of each policy for mitigation purposes. Rank these as high, medium, or low. Explain the rationale for this evaluation in column 4 (explain why the policy helps or hurts your mitigation efforts).**

  For example, your community's zoning ordinance may allow development in the floodplain. Such a policy would have low mitigation effectiveness. However, a zoning ordinance that prevented development in the floodplain would rank as a highly effective mitigation policy.

WORKSHEET #3: COMMUNITY CAPABILITY ASSESSMENT

Policies and Programs (ex. zoning ordinance, growth management act)	**Document Reference** (ex. comprehensive plan & page number)	**Effectiveness for Mitigation** (ex., low, medium, high)	**Rationale for Effectiveness** (ex., low because allows development in floodplain)

What are the hazard mitigation goals of the community? How do these goals fit with its other goals? How does the community envision its response to natural hazards in the future? An answer to these questions may already exist in the form of goals and policies in the community's comprehensive plan, capital improvements plan, emergency management plan, building and subdivision ordinances, and other documents. By reviewing these plans and policies and listing the relevant goals, you may find statements that are helpful for developing your mitigation priorities.

List any community goals that are relevant to mitigation.

Many communities may not have addressed hazards when they established their goals and objectives. As a result, hazard risks may have been overlooked, and some goals and objectives may even hinder mitigation. Thus, it may be necessary to create new goals or to reconcile old ones with the community's interest in mitigation. In most cases, however, existing community goals will support mitigation initiatives.

Completing Worksheet 4 will help you see how a mitigation strategy can address other community goals, such as preserving open space, providing public access to the coast, managing growth, prioritizing capital improvements and protecting natural resources.

The following are some examples of goals you should look for:

- Provide more community open space.
- Ensure that emergency services are adequate to protect public health and safety.
- Preserve environmentally-sensitive areas.
- Maintain a stable and growing business community.
- Preserve community historic resources.
- Provide infrastructure that accommodates future growth.

Become
A Disaster Resistant
Community!

WORKSHEET #4: COMMUNITY GOALS

Source	Existing Goal Statement	Effective Goal for Mitigation? (If not, how to modify goal)
Comprehensive Plan		
Capital Improvement Plan		
Economic Development Plan		
Transportation Plan		
Emergency Management Plan		
Stormwater Management Plan		
Parks and Open Space		
Other		

STEP 5: MITIGATION STRATEGY

The main goal of this workbook is to help communities in Washington develop their own strategies to reduce their vulnerability to hazards. In each community, that strategy will consist of specific mitigation initiatives or projects. This section will guide you in creating a list of mitigation initiatives or projects so your community can match programs to vulnerable areas.

In Worksheet 3, you listed existing policies and evaluated their effectiveness for mitigating natural hazards. Worksheet 4 asked you to look at your community's existing goals and objectives, as reflected in current plans, and to determine whether these goals address your mitigation needs. Worksheet 5 is your chance to add new mitigation goals and policies to fill the gap between existing policy (Worksheet 3) and your (new) mitigation goals (Worksheet 4). That is, Worksheet 5 will help identify gaps where new policies or projects are needed to reduce the community's vulnerability to natural hazards. Example initiatives are described in *Tools and Techniques for Mitigating the Effects of Natural Hazards*. (See "Publications" for information on obtaining a copy.)

- **Copy hazard areas identified on Worksheet 2 into Worksheet 5, column 1: Hazard Area Location.**

- **List hazard types affecting each location in column 2: Type of Hazard(s).**

- **Identify new initiatives or changes to existing policies to improve resistance to the identified hazard(s) in each affected location. List these in column 3: New Initiatives or Recommended Policy Changes.**

Consider the following when evaluating which policies to add or change. Your community's

- capability to implement the required new policy,
- vulnerability to hazards, and
- your community's goals and needs.

- **Some of these policies and initiatives will help you meet the goals you identified on Worksheet 4. List the goals you are helping to achieve in column 4: Goals Addressed.**

- **Assign responsibility for each initiative and set a date for its completion. Note these in column 5 and 6: Responsible Party and Date Due.**

- **After completing Worksheet 5 for each of the hazard areas locations identified in Worksheet 2a, complete Worksheet 5a.**

  - Worksheet 5a re-orders the information from Worksheet 5 and allows you to see what policy changes are needed to mitigate hazards in the locations identified. Some policies may affect more than one hazard mitigation area.

  - You may need to photocopy these sheets to provide enough space. This list of proposed projects should guide funding and policy decisions both before and after a disaster.

WORKSHEET #5: MITIGATION STRATEGY

Hazard Area Location	Type of Hazard(s)	New Initiative or Recommended Policy Changes	Goals Addressed	Responsible Party	Date Due

WORKSHEET #5a: SUMMARIZED STEPS FOR MITIGATION STRATEGY

New Initiative or Recommended Policy Changes	**Hazard Areas Affected** (List all areas affected by policy changes)	Responsible Party	Date Due	Hazard Type(s)

PUTTING IT ALL TOGETHER

This workbook can help you develop a strategy to reduce your community's present and future vulnerability to hazards. The strategy should reflect your community's unique needs, vulnerability, and capabilities and should include the right mix of new and revised programs, ordinances, policies, and other tools that work for your community. Completing the workbook, however, is just the beginning. For the strategy to be effective, the governing body of your community must adopt it and the appropriate agency or office must implement it.

Development of the mitigation strategy should not be an isolated effort, independent of other government functions. On the contrary, mitigation efforts should be integrated with other community planning and development activities, such as preparing land use and subdivision plans and ordinances; enforcing construction and building regulations, and making choices about future spending for infrastructure.

By integrating mitigation concepts into governmental activities today at a relatively low cost, the community can reduce its vulnerability to hazards and avoid more costly losses from future disasters. The time, energy, and resources invested in mitigation could significantly reduce the demand for future dollars by reducing the amount needed for emergency recovery, repair, and reconstruction following a disaster.

Mitigation is an on-going process. It is not just something that occurs after a disaster strikes. As conditions in your community change, you may find it necessary to revisit the strategy you developed here. Repeating the process of working through this book will not only allow you to update your strategy, it will allow you to assess how well your strategy is working. This will be especially true immediately following a disaster. During this time, people are more receptive to making changes to mitigate future disasters. You should re-examine your mitigation strategy each year or at some other regular interval.

"MITIGATION IS ABOUT LOWERING THE RISK AND REDUCING THE EFFECTS OF DISASTERS, AND THIS AMBITIOUS VENTURE HAS THE POTENTIAL TO REAP GREAT REWARDS. TO SUCCESSFULLY MITIGATE AGAINST DISASTER WILL REQUIRE THE COMBINED TALENTS AND CONCERTED EFFORTS OF ALL LEVELS OF GOVERNMENTS, ACADEMIA, PROFESSIONAL AND VOLUNTARY ORGANIZATIONS, THE CORPORATE SECTOR, AND ALL AMERICANS."

William J. Clinton
President of the United States
December 6, 1995

APPENDIX A: WHERE TO GET HELP

ORGANIZATIONS

- **Washington State Emergency Management Division**
  Camp Murray, WA 98430-5122
  Tel: 800.562.6108
  Web: http://www.wa.gov/wsem

- **Washington State Office of Financial Management (OFM)**
  300 Insurance Building
  PO Box 43113
  Olympia 98504-3113
  Tel: 360.902.0555
  Web: http://www.ofm.wa.gov/

- **Washington State Department of Community, Trade and Economic Development.**
  906 Columbia Street SW
  PO Box 48300
  Olympia, WA 98430-8300
  Tel: 360.753.7426
  Fax: 360.586.3582
  Web: www.cted.wa.gov

- **Washington State Department of Natural Resources**
  1111 Washington Street SE
  PO Box 47000
  Olympia, WA 98504-7000
  360.902.1000
  Web: http://www.wa.gov/dnr

- **Washington State Department of Ecology**
  PO Box 47600
  Olympia, WA 98504-7600
  Tel: 360.407.6000
  Web: http://www.wa.gov/ecology

- **Association of Washington Cities**
  1076 Franklin Street SE
  Olympia, WA 98501
  Tel: 360.753.4137
  Fax: 360.753.4896
  Web: http://www.mrsc.org/awcfiles/awc.htm

- **National Emergency Management Association**
  c/o Council of State Governments
  P.O. Box 11910
  Lexington, KY 40578
  (606) 244-8000
  http://www.nemaweb.org/index.cfm

- **Nation Weather Service**
  NOAA Public & Constituent Affairs
  Room 6013
  14th Street & Constitution Avenue, NW
  Washington, DC 20230
  Telephone: (202) 482-6090
  FAX: (202) 482-3154
  Web: http://www.noaa.gov/ or http://www.nws.noaa.gov/index.html

- **University of Washington Geophysics Program**
  Graduate Program in Geophysics
  202 ATG Building (Atmospheric Sciences and Geophysics Building)
  University of Washington
  Box 351650
  Seattle, WA 98195-1650
  (206) 543-8020
  Web: http://www.geophys.washington.edu/

- **Washington State Association of Counties (W.S.A.C.)**
  206 Tenth Avenue SE
  Olympia, WA, 98501
  Tel: 360.753.1886
  Fax: 360.753.2842
  Web: http://www.wacounties.org/wsac/index.htm

- **International Association of Emergency Managers (IAEM)**
  111 Park Place
  Falls Church, VA 22046-4513
  Tel: 703.538.1795
  Fax: 703.241.5603
  Web: http://www.iaem.com/

- **Washington Association of Building Officials**
  PO Box 7310
  Olympia WA 98507-7310
  Tel: 360.586.6725
  Toll-Free: 888.664.9515
  Fax: 360.586.5538
  Web: http://www.halcyon.com/wabo/

- **Federal Emergency Management Agency**
  500 C Street SW
  Washington, DC 20472

  FEMA Region X
  Federal Regional Center
  130 228th Street, SW
  Bothell, WA 98021-9796
  Tel: 425.487.4600
  Fax: 425.487.4622
  http://www.fema.gov/reg-x/regx.htm

  FEMA National Emergency Training Center
  16825 South Seton Avenue
  Emmitsburg, MD 21727
  Tel: 301.447.1000
  Web: http://www.fema.gov/emi/

- **Office of Management and Budget (OMB)**
  New Executive Office Building
  725 17th Street, NW, Room 8002
  Washington, DC 20503
  Tel: 202.395.3080
  Web: http://www.whitehouse.gov/omb/

- **Cascades Volcano Observatory (USGS)**
  David A. Johnston Cascades Volcano Observatory
  5400 MacArthur Blvd
  Vancouver, WA 985661
  Web: http://vulcan.wr.usgs.gov/home.html

- **U.S. Small Business Administration (SBA)**
  Disaster Assistance Division
  Office of Disaster Assistance
  409 Third Street SW
  Washington, DC 20416
  Tel: 202.205.6734
  Web: http://www.sbaonline.sba.gov/DISASTER

- **US Army Corps of Engineers**
  Floodplain Management Services and Coastal Resources Branch
  20 Massachusetts Avenue NW
  Washington, DC 20314
  Tel: 202.272.0169
  Web: http://www.usace.army.mil

- **U.S. Geological Survey (USGS)**
  807 National Center
  12201 Sunrise Valley Drive
  Reston, VA 20192
  Tel: 703.648.4000
  Web: http://www.usgs.gov

- **US Census Bureau**
  Public Information Office
  Room 2705, FB-3U.S.
  Washington, DC 20233
  Tel: 301.457.4100
  FAX 301.457.4714
  Web: http://www.census.gov

SOURCES OF FUNDING

- **Hazard Mitigation Grant Program (HMGP)** – The Federal Disaster Assistance Act (Stafford Act) provides funds authorized by the federal government and made available by FEMA for a cost-share program to states. The HMGP provides 75% of the funds while the states provide 25% (usually evenly divided between the state and local jurisdiction) of the funds for mitigation measures through the post-disaster planning process. The state Emergency Management Division, through the State Hazard Mitigation Officer, administers the program in Washington State. The state share may be met with cash or in-kind services. The program is available only for areas affected by a presidential disaster declaration.

- **Disaster Preparedness Improvement Grant (DPIG)** – This grant provides federal matching funds for communities to develop hazard mitigation plans, expand existing plans, update disaster preparation plans, and to prepare the administrative plans required to qualify for Hazard Mitigation Grant Program grants. Funds for the DPIG are provided by FEMA and administerd by the Emergency Management Division for the state.

- **Flood Mitigation Assistance (FMA) Program** – This program provides grants for cost effective measures to reduce or eliminate the long-term risk of flood damage to the built environment and real property. The program's main goal is to reduce repetitive losses to the National Flood Insurance Program (NFIP). FMA is available to eligible communities every year, not just after a presidential disaster declaration. FMA and the state Emergency Management Division administer the program.

- **Public Assistance Program (PA)** – The Public Assistance Program provides federal aid to communities to help save lives and property in the immediate aftermath of a disaster and to help rebuild damaged facilities. Grants cover eligible costs associated with the repair, replacement, and restoration of facilities owned by state or local governments and nonprofit organizations.

- **Small Business Administration (SBA) Disaster Assistance Programs** – These programs provide loans to businesses and individuals affected by presidential and SBA disaster declarations. The program provides direct loans to businesses to repair or replace uninsured disaster damage to property owned by the business, including real estate, machinery, and equipment, inventory and supplies. Businesses of any size are eligible. Nonprofit organizations are also eligible. Assistance to individuals comes in the form of low-interest loans for repair or replacing damaged reel and personal property. The SBA administers the Disaster Assistance Programs.

- **SBA Pre-disaster Mitigation Loans –** The new loan program began in January 2000 and is funded for five years. This program makes funds for mitigation available to businesses in Project Impact communities.

- **Community Development Block Grant (CDBG)** – The CDBG program provides grants to entitlement communities (metropolitan cities and urban counties) for post-disaster hazard mitigation and recovery following a presidential declaration of a major disaster or emergency. Funds can be used for activities such as acquisition, rehabilitation, or reconstruction of damaged properties and facilities and redevelopment of disaster-affected areas. Funds may also be used for emergency response activities, such as debris clearance and demolition and extraordinary increases in the level of necessary public services. U.S. Housing and Urban Development provides funds for CDBG and the Washington State Department of Community, Trade, and Economic Development administers the program.

- **Flood Control Assistance Account Program (FCAAP)** – (RCW 86.26.050, WAC 173-145-010)
  Provides that county and other municipal corporations responsible for flood control maintenance may apply to the Department of Ecology for financial assistance for the preparation of comprehensive flood control management plans and for flood control maintenance projects as described in RCW 86.26.105. The department determines priorities, allocates available funds from the FCAAP among those counties applying for assistance, and adopts regulations establishing the criteria by which such allocations shall be made. Criteria are based upon proposals that are likely to bring about public benefits commensurate with the amount of state funds allocated.

PUBLICATIONS

Washington State Emergency Management

- *Hazard Identification Vulnerability Analysis*
- *Comprehensive Emergency Management Planning Guide*
- *Comprehensive Emergency Management Plan*
- *Hazard Mitigation Strategy*
- *Disaster Recovery Plan*

Federal Emergency Management Agency (FEMA)

- *Guide for Review of State and Local Emergency Operations Plans*
- *Disaster Assistance: A Guide to Recovery Programs* (FEMA Publication #229(4))
- *Mitigation: Cornerstone of Building Safer Communities*, 1995

FEMA publications are available from the FEMA Distribution Facility: 1.800.480.2520

Center for Urban and Regional Studies (CURS)

- *Making Mitigation Work: Recasting Natural Hazards Planning and Implementation, February 1997.*

National League of Municipalities (NLM)

- *Emergency Management Mini-Guide*

Office of Management and Budget (OFM)

- *Federal Programs Offering Non-Structural Flood Recovery and Floodplain Management Alternatives* – Article by fax (202.395.4817) or from OMB's web site http.// www.whitehouse.gov/wh/new/html/flood.pdf

OTHER SOURCES OF INFORMATION

Item	**Available From**
Land Use Plan	City/County Planning Office
Capital Facilities Plan	City/County Planning Office
FIRMS	FEMA
Tax Maps	County Tax Assessor
Emergency Management Officials	County/city Emergency Management Office
GIS	Department of Ecology
Insurance Claims	NFIP and local insurers
NFIP	Department of Ecology or local insurers
Topographical Maps	United States Geological Service
Slosh Maps (for coastal areas)	US Army Corps of Engineers

APPENDIX B: GLOSSARY

A *Major Disaster* – is defined as any natural catastrophe, or, regardless of cause, any fire, flood, or explosion that causes damage of sufficient severity and magnitude to warrant assistance to supplement state, local, and disaster relief organization efforts to alleviate damage, loss, hardship, or suffering.

An *Emergency* – is defined as any occasion or instance for which federal assistance is needed to supplement state and local efforts to save lives and protect property and public heath and safety, or to lessen or avert the threat of a catastrophe.

Community Rating System (CRS) – Administered by FEMA, the Community Rating System provides flood insurance discounts for residents in National Flood Insurance Program (NFIP) communities that undertake floodplain mitigation activities above the minimum NFIP standards.

Federal Emergency Management Agency (FEMA) – An independent agency of the federal government, reporting to the president. FEMA's mission is to reduce loss of life and property and protect our nation's critical infrastructure from all types of hazards through a comprehensive, risk-based, emergency management program of mitigation, preparedness, response, and recovery.

Flood Insurance Rate Map (FIRM) – The official map of a community prepared by FEMA, showing base flood elevations along with the special hazard areas and the risk premium zones.

Hazard Mitigation Grant Program (HMGP) – Authorized under section 404 of the Stafford Act, the HMGP provides funding for cost-effective hazard mitigation projects in conformance with the post-disaster mitigation plan required under Section 409 of the Stafford Act.

Mitigation – Any action taken to permanently reduce or eliminate long-term risk to people and their property from the effects of hazards. Some examples include elevating houses above base flood levels, acquiring land in high hazard areas, and zoning land in floodplains for parkland or low density use.

National Flood Insurance Program (NFIP) – Administered by the Federal Insurance Administration, the NFIP makes federally subsidized flood insurance available to property owners in communities that participate in the program. Participating communities must adopt and enforce floodplain management ordinances that meet the criteria established by FEMA.

Section 409 Hazard Mitigation Plan – Requires the identification and evaluation of mitigation opportunities, and that all repairs be made in accordance with applicable codes and standards as a condition of receiving federal disaster assistance. It was enacted to encourage communities to identify and mitigate natural hazards.

The Ocean Resources Management Act – (RCW 43.143.005 – 43.143.902)
Enacted in 1989 and amended in 1997, this chapter of the RCW articulates policies and establishes guidelines for the exercise of state and local management authority over Washington's coastal waters, seabed, and shorelines. This statute addresses the coastal and ocean natural resources within

three miles of the state's coastline, defined here as from mean high tide seaward three miles along the Washington coast from Cape Flattery south to Cape Disappointment.

The statute enumerates eight criteria to be met or exceeded in the decision-making processes by which the state of Washington and local governments must develop plans for the management, conservation, use, or development of natural resources in Washington's coastal waters (RCW 43.143.030).

The Seashore Conservation Act – (RCW 43.51.650-685)
Enacted in 1967 and substantially amended in 1969, the Seashore Conservation Act (SCA) declares the necessity of dedicating the uses of the Pacific Ocean Beaches of Washington "…to public recreation and to provide certain recreational and sanitary facilities." The SCA also established "for the recreational use and enjoyment of the public" the Washington State Seashore Conservation Area and placed its administration under the jurisdiction of Washington State Parks and Recreation Commission. The SCA applies to "the beaches bounding the Pacific Ocean from the Straits of Juan de Fuca to Cape Disappointment at the mouth of the Columbia River.

The Shoreline Management Act of 1971 – (RCW 90.58) (WAC 173-145)
The citizens of Washington State passed the Shoreline Management Act (SMA) in 1971 in recognition of the state's shorelines as "among the most valuable and fragile of its natural resources" and the great concern throughout the state relating to their utilization, protection, restoration, and preservation. The SMA includes all shorelines (streams greater than 20 cfs and associated wetlands and lakes larger than 20 acres) and shorelands (lands extending 200 feet from the Ordinary High Water Mark of the shoreline). The goals of the SMA are to:

1. Plan for and foster all reasonable and appropriate uses of the shorelines;
2. insure development of shorelines in a manner which, while allowing for limited reduction of rights of the public in the navigable waters, will promote and enhance the public interest;
3. protect against adverse effects to the public health, the land and its vegetation and wildlife, and the waters of the state and their aquatic life.

The SMA calls for cooperative program between local governments and the Department of Ecology. It provides local governments with special guidelines for creating their policies and regulations for shorelines of statewide significance. Regulation must minimize human-made intrusions on the shoreline. Ecology protects and manages the water of the state through implementation of the SMA.

Vulnerability – The extent to which people will experience harm and property will be damaged from a hazard.

TABLE 1: COUNTY P0PULATION ESTIMATES

From the U.S. Bureau of the Census Internet site: http://www.census.gov/population/www/estimates/countypop.html

County	July 1, 1998	April 1, 1990	# Increase	% Increase
Adams	15,324,263	13,603	1,721	12.7%
Asotin	21,264	17,605	3,659	20.8%
Benton	136,250	112,560	23,690	21.0%
Chelan	60,052	52,250	7,802	14.9%
Clallam	64,169	56,210	7,959	14.2%
Clark	326,943	238,053	88,890	37.3%
Columbia	4,156	4,024	132	3.3%
Cowlitz	91,574	82,119	9,455	11.5%
Douglas	33,631	26,205	7,426	28.3%
Ferry	7,171	6,295	876	13.9%
Franklin	46,459	37,473	8,986	24.0%
Garfield	2,330	2,248	82	3.6%
Grant	70,545	54,798	15,747	28.7%
Grays Harbor	67,739	64,175	3,564	5.6%
Island	70,319	60,195	10,124	16.8%
Jefferson	26,232	20,406	5,826	28.6%
King	1,654,876	1,507,305	147,571	9.8%
Kitsap	232,623	189,305	43,318	22.9%
Kittitas	31,714	26,725	4,989	18.7%
Klickitat	19,295	16,616	2,679	16.1%
Lewis	68,163	59,358	8,805	14.8%
Lincoln	9,734	8,864	870	9.8%
Mason	49,876	38,341	11,535	30.1%
Okanogan	38,327	33,350	4,977	14.9%
Pacific	20,802	18,882	1,920	10.2%
Pend Oreille	11,526	8,915	2,611	29.3%
Pierce	676,505	586,203	90,302	15.4%
San Juan	12,493	10,035	2,458	24.5%
Skagit	99,357	79,545	19,812	24.9%
Skamania	9,805	8,289	1,516	18.3%
Snohomish	587,783	465,628	122,155	26.2%
Spokane	408,669	361,333	47,336	13.1%
Stevens	39,464	30,948	8,516	27.5%
Thurston	202,255	161,238	41,017	25.4%
Wahkiakum	3,857	3,327	530	15.9%
Walla Walla	53,702	48,439	5,263	10.9%
Whatcom	156,830	127,780	29,050	22.7%
Whitman	39,487	38,775	712	1.8%
Yakima	218,062	188,823	29,239	15.5%

WORKSHEET #1: HAZARD IDENTIFICATION AND ANALYSIS

(See *Washington State Hazard Identification Vulnerability Analysis*)				
Hazard	**Likelihood of Occurrence**	**Location** (i.e., small, medium, large)	**Impacts** (i.e., low, medium, high)	**Hazard Index** (i.e., rank by combining how much impact & how frequently this hazard affects your community)
Earthquake				
Landslide				
Flooding				
Wildfire				
Hazardous Materials				
Tornado				
Winter Storms				
Wind Storms				

WORKSHEET #2: AREA VULNERABILITY ASSESSMENT

Hazard Area Location _____

(Copy this form and complete for each hazard in your community)

	Developed Land			Undeveloped Land		
	Number of People (table 1, col. 2)	**Number of Buildings** (from tax records)	**Approximate Value** (from tax records)	**Number of People** (Table 1, column 5 if developed under existing policies)	**Number of Buildings** (if developed under existing conditions)	**Approximate Value** (average current value times the number of buildings from the previous column)
Residential (use max. figures)						
Commercial						
Industrial						
Public Buildings and Critical Facilities						
Sewage Treatment Plant						
Water Treatment Plant						
Hospitals						
Schools						
Roads						
Police						
Fire						
Hazardous Facilities						
Total						

WORKSHEET #2a: TOTAL VULNERABILITY SUMMARY

Developed Land					Undeveloped Land		
Hazard Area Location	**Total People**	**Total Buildings** (by type - example residential = commercial = industrial =)	**Approximate Value** (in dollars)	**Number of Critical Facilities** (example - water treatement plant)	**Projected Number of People**	**Projected Number of Buildings**	**Projected Value**
Total							

WORKSHEET #3: COMMUNITY CAPABILITY ASSESSMENT

Policies and Programs (ex. zoning ordinance, growth management act)	**Document Reference** (ex. comprehensive plan & page number)	**Effectiveness for Mitigation** (ex., low, medium, high)	**Rationale for Effectiveness** (ex., low because allows development in floodplain)

WORKSHEET #4: COMMUNITY GOALS

Source	Existing Goal Statement	Effective Goal for Mitigation? (If not, how to modify goal)
Comprehensive Plan		
Capital Improvement Plan		
Economic Development Plan		
Transportation Plan		
Emergency Management Plan		
Stormwater Management Plan		
Parks and Open Space		
Other		

WORKSHEET #5: MITIGATION STRATEGY

Hazard Area Location	Type of Hazard(s)	New Initiative or Recommended Policy Changes	Goals Addressed	Responsible Party	Date Due

WORKSHEET #5a: SUMMARIZED STEPS FOR MITIGATION STRATEGY

New Initiative or Recommended Policy Changes	**Hazard Areas Affected** (List all areas affected by policy changes)	**Responsible Party**	**Date Due**	**Hazard Type(s)**

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Mitigation Workbook for Local Governments
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"By taking actions in our homes, businesses, and our communities to mitigate risks, we can reduce disaster impacts and break the cycle of losses that we have witnessed in recent years."

- Michael J. Armstrong
FEMA, Associate Director for Mitigation